
Status & Remarks

The application presently contains the following claims:

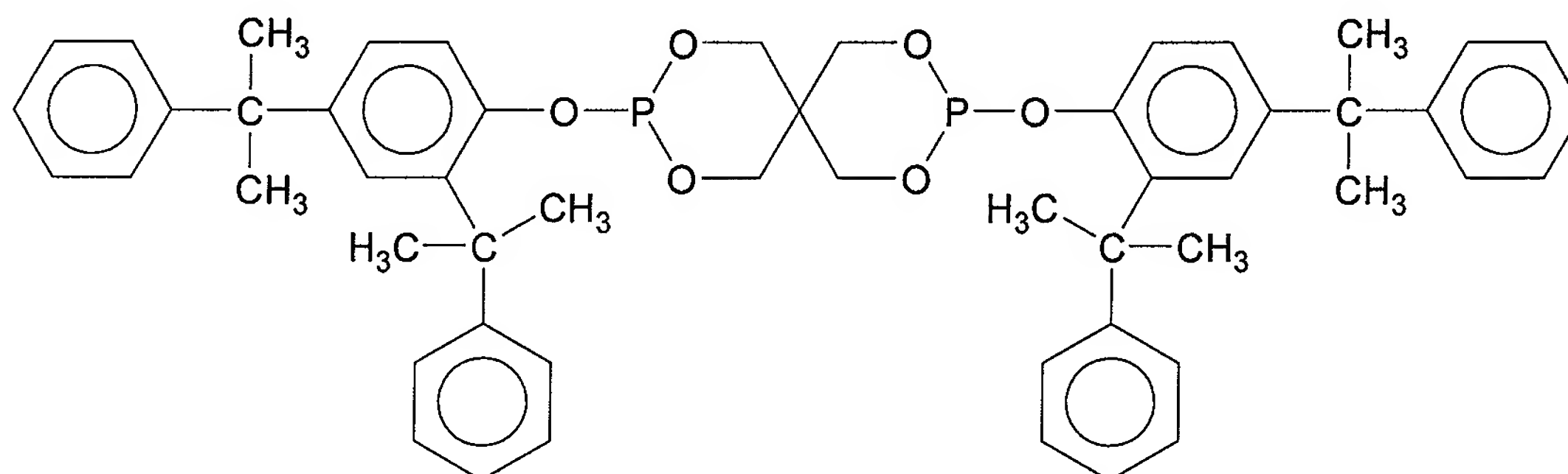
<i>Independent Claim #</i>	<i>Dependent Claim #s</i>
1	2-29, 80-83
30	31-58, 84-87
59	60-79, 88-89

Claims 1, 16, 30, 32, 45 and 69 are amended. Support for the amendments may be found with reference to paragraph [0014] of the application as originally filed. Claims 90-92 are newly added. Support for these newly added claims may be found with reference to paragraph [0027] in which it is indicated that "a solvent is not required and is thus optional."

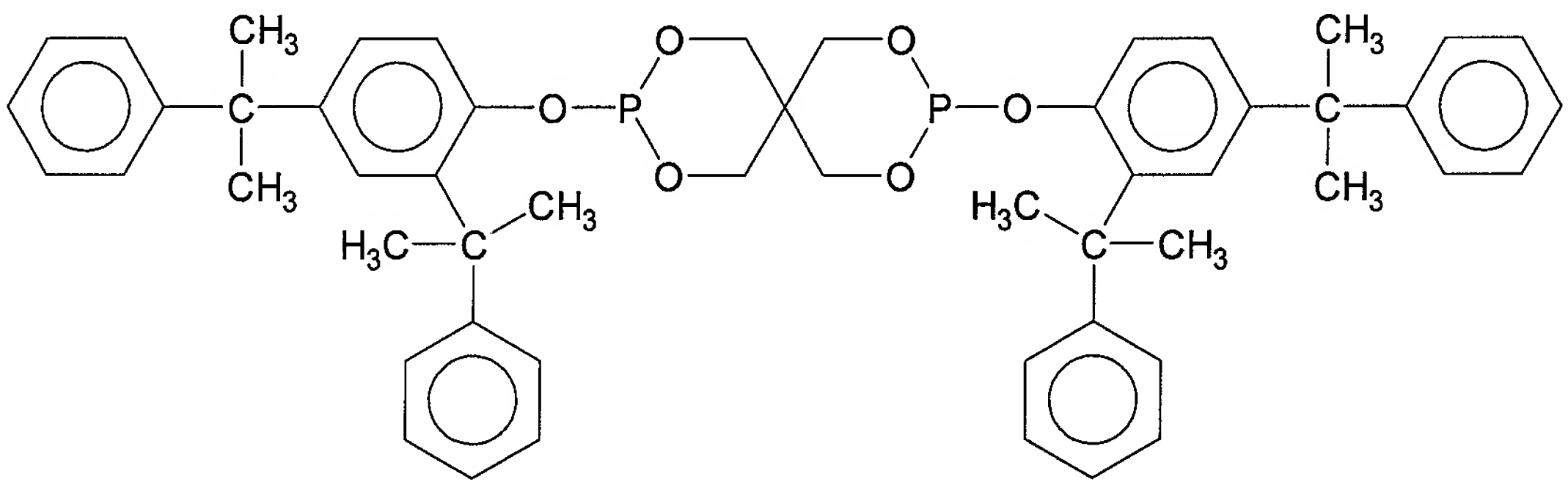
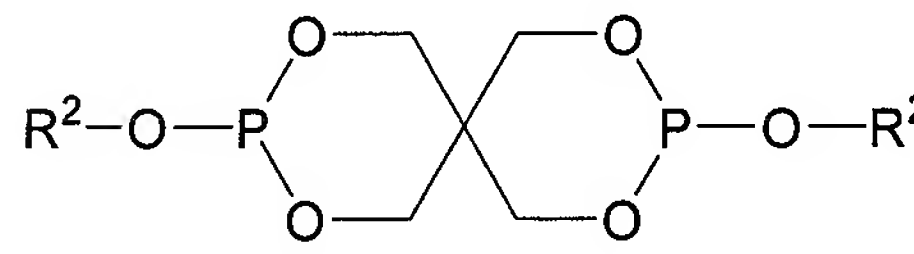
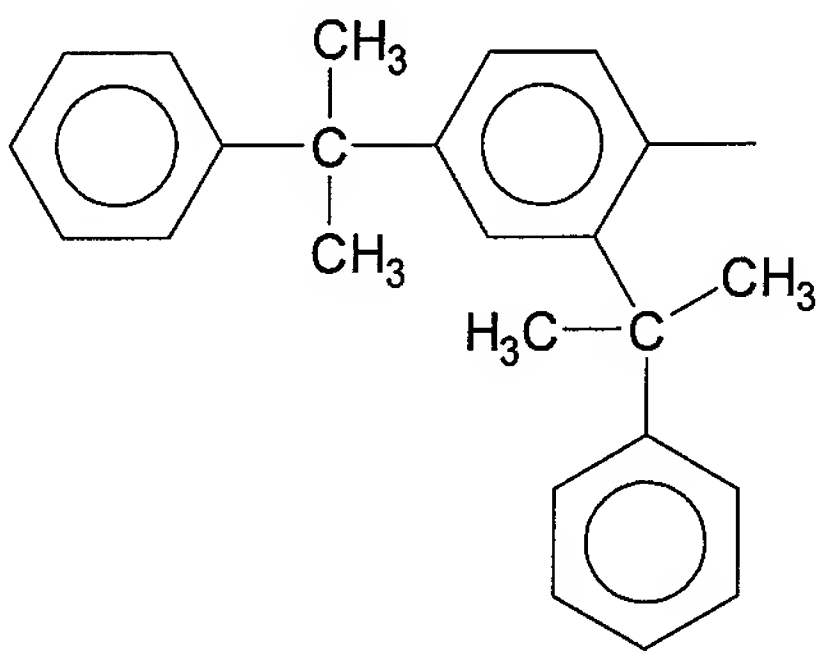
Election / Restrictions

The examiner has represented that the Markush Group set forth in the claims includes both independent and distinct inventions, and patentably distinct compounds (species) within each invention and required a restriction to one group, of which the examiner listed one group. The applicant's attorney verifies the election to the Group identified by the examiner, namely claims 1-89 drawn to a process for preparing a pentaerythritol diphosphite, classified in various subclasses of class 568.

The examiner has further represented that restriction of a Markush Group is proper where it encompasses a plurality of independent and distinct inventions where two or more members are so unrelated and diverse that a prior art reference anticipating the claim with respect to one of the members would not render the other member(s) obvious. Specifically, the examiner has required the election of a single pentaerythritol diphosphite including an exact definition of each substitution on the base molecule. The applicant's attorney elects bis(2,4-dicumylphenyl) pentaerythritol diphosphite, formula VIII, as the chemical structure of the species election.



However, in making this election, by definition, the non-elected and non-examined subject matter identified by the examiner on page 10 of the pending office action is respectfully submitted to be illogical. Specific as to the identification of R^2 and as clearly shown below, the elected specie, namely bis(2,4-dicumylphenol)pentaerythritol diphosphite, will require that R^2 have a minimum of 24 carbon atoms, which would appear to be a non-searched specie.

 <p>elected specie, namely bis(2,4-dicumylphenol)pentaerythritol diphosphite</p>	
	
R^2 = minimum of 24 carbon atoms	

As the examiner has indicated, examination will proceed on the elected compound followed by a clear statement of the examined invention defined by those class(es) and subclass(es) as set forth in a first office action on the merits. The examiner has further represented that the restriction requirement will not be made final until such time as the applicant is informed of the full scope of the compounds along with (if appropriate) the process of using or making the compound under examination.

The examiner has kindly reminded the applicant's attorney that upon cancellation of any claims to a non-elected invention, the issue of inventorship must be revisited. The applicant's attorney has addressed this issue with the sole inventor, and concluded that the named inventor remains appropriate.

The examiner has kindly provided a statement that the inventions are independent and distinct from each other in that they use different starting materials, reagents and reaction conditions, as illustrated in paragraphs [0039] through [0081] of the Specification. In all candor, the applicant's attorney is more than mildly perplexed at the support provided by the examiner for this comment. The claims are for a process for the synthesis of a diphosphite of defined molecular geometry. That diphosphite can be used in many different types of polymers, as is illustrated in paragraphs [0045] through [0084]. The end use applications has no relationship to different starting materials, reagents and reaction conditions. Clarification would be appreciated for the education of the applicant's attorney in currently applicable Patent Office procedure as to how the end-use described for the phosphite supports a restriction to the claims based on different starting materials, reagents and reaction conditions.

The above comment is made all the more pertinent in light of the subsequent comments made in the office action where the examiner discusses issues pertinent to product and process claims and issues attendant rejoinder thereof. To the knowledge of the applicant's attorney, there are no product claims pending in the current application, and therefore, the relevance of the discussion associated with the same is once again, perplexing.

The applicant's attorney verifies the oral election to prosecution the invention of Group I, Claims 1-89 with the species of claim 59 as the initial election. The applicant's attorney does understand that the examiner is restricting the searched claims to a method of synthesizing pentaerythritol diphosphites of formula (VI) but the applicant's attorney does not understand how the examiner has concluded that this limits the diphosphite to wherein R^2 is optionally a substituted phenyl group and the monophosphite is triphenyl phosphite, trimethylphosphite or triethylphosphite for the reasons advanced above. The examiner has indicated that the non-elected and non-examined subject matter will include the synthesis of pentaerythritol diphosphites of formula (VI) wherein R^2 is C_{8-22} alkyl, C_{8-22} alkenyl, C_{7-40} alkylaryl and C_{7-40} arylalkyl. However, this is illogical and would respectfully request the examiner to aid the applicant's attorney in understanding the logic of this position in light of the elected specie, namely the specie of claim 59.

Claim Rejections – 35 USC §102

The examiner has rejected claims 1-89 under this section, subparagraph (b) as being anticipated by Stevenson et al., U.S. Patent No. 5,438,086 (hereinafter '086). The examiner has corrected noted that the claimed process of the present invention is very similar to that described in the '086 patent, with a few more limitations. And it is precisely for this admitted reason stated by the examiner, that the propriety of the designation of the '086 patent being a §102 reference is questioned. The presently claimed invention is not the same as the patented '086 invention. In fact, it is clear that there is absolutely zero reference in the teachings of the '086 patent which teach the following limitation, namely:

“removing phenol and reaction products other than diphenylpentaerythritol
diphosphite from said intermediate reaction mixture”

as illustrated in step (b) of claim #59 for example, or which teach

“removing phenol from said second reaction mixture” in step (d).

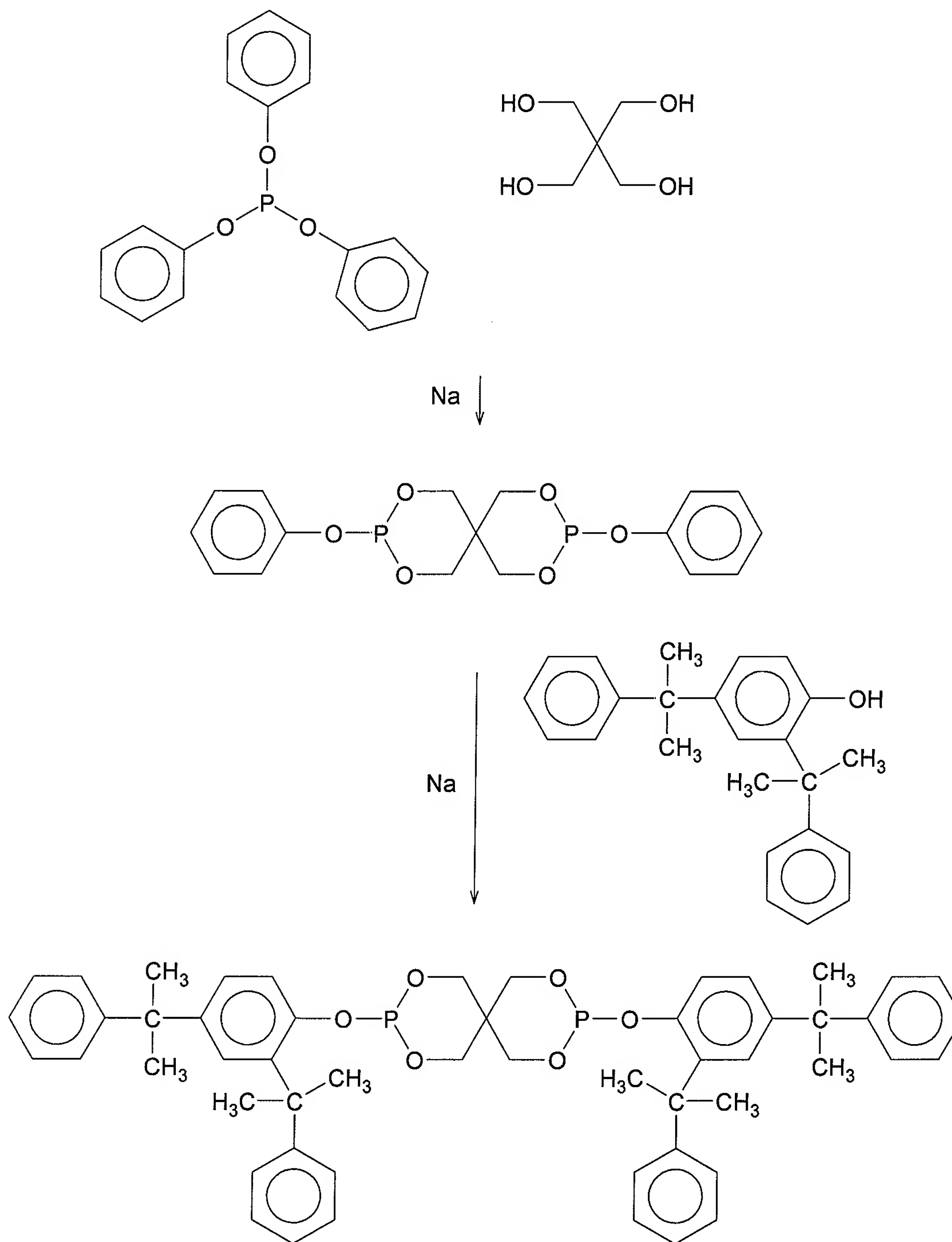
This is only taught and claimed in the pending application. Therefore, it is respectfully submitted that the '086 patent more properly falls into the category of a §103 reference and discussion of the differences between the claimed current invention and that of the '086 patent are presented below.

Claim Rejections – 35 USC §103

The Examiner has rejected claims 1-89 under this section, subparagraph (a) as unpatentable over Stevenson et al., the previously identified '086 patent. The examiner has indicated that the same intermediates would be expected to have been synthesized by Stevenson et al., in the '086 patent, and thereby rendering obvious the instant invention. The examiner has kindly offered a suggestion that an affidavit showing a side-by-side comparison of the instant reaction and the prior art reaction would be helpful, particularly if it showed unexpected results.

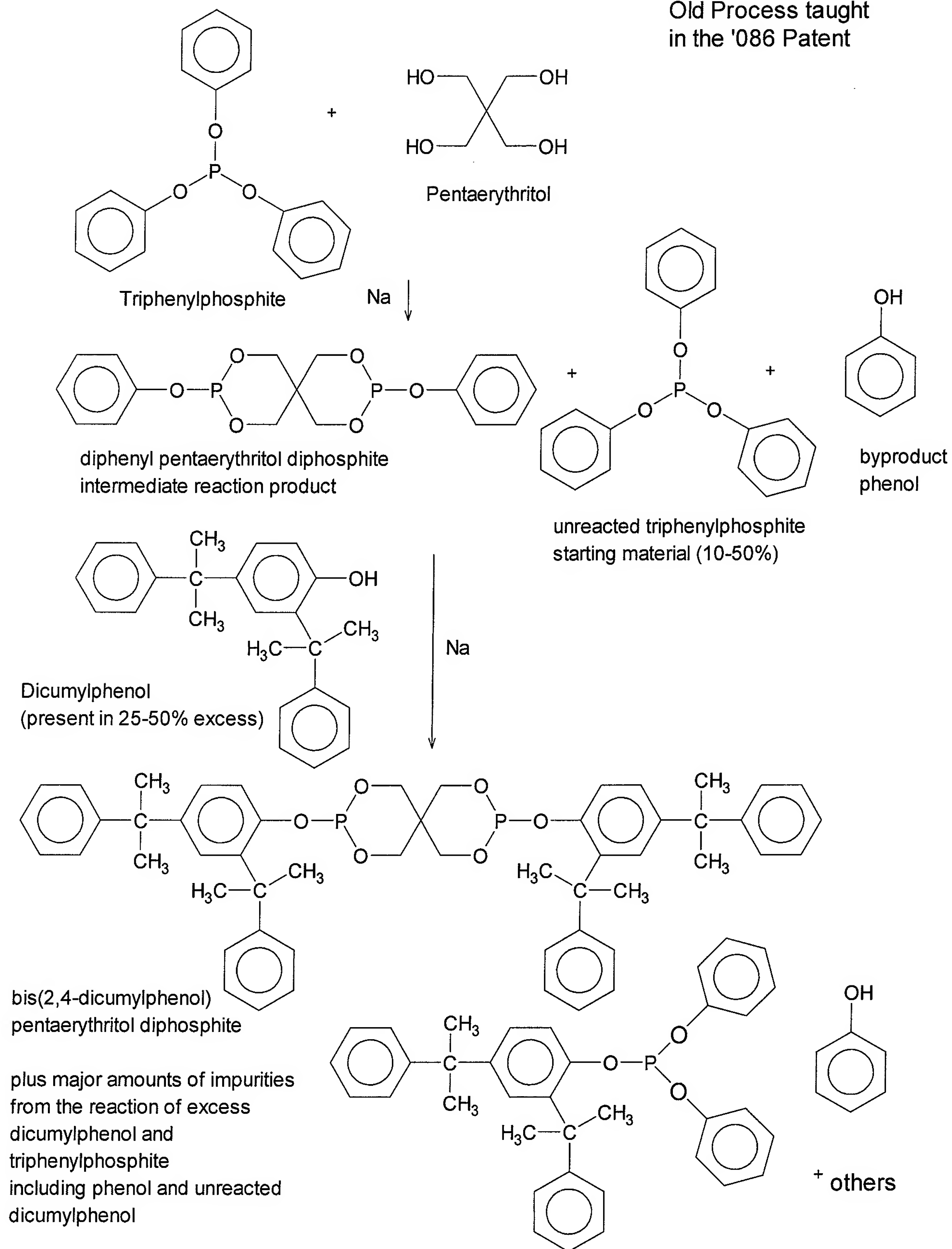
The applicant's attorney has presented the following series of graphical illustrations of the reactions of interest for the examiner. In particular, Schematic II is reproduced below as illustrative of the reaction sequence taught by the '086 patent and practiced by the assignee of the patent for many years.

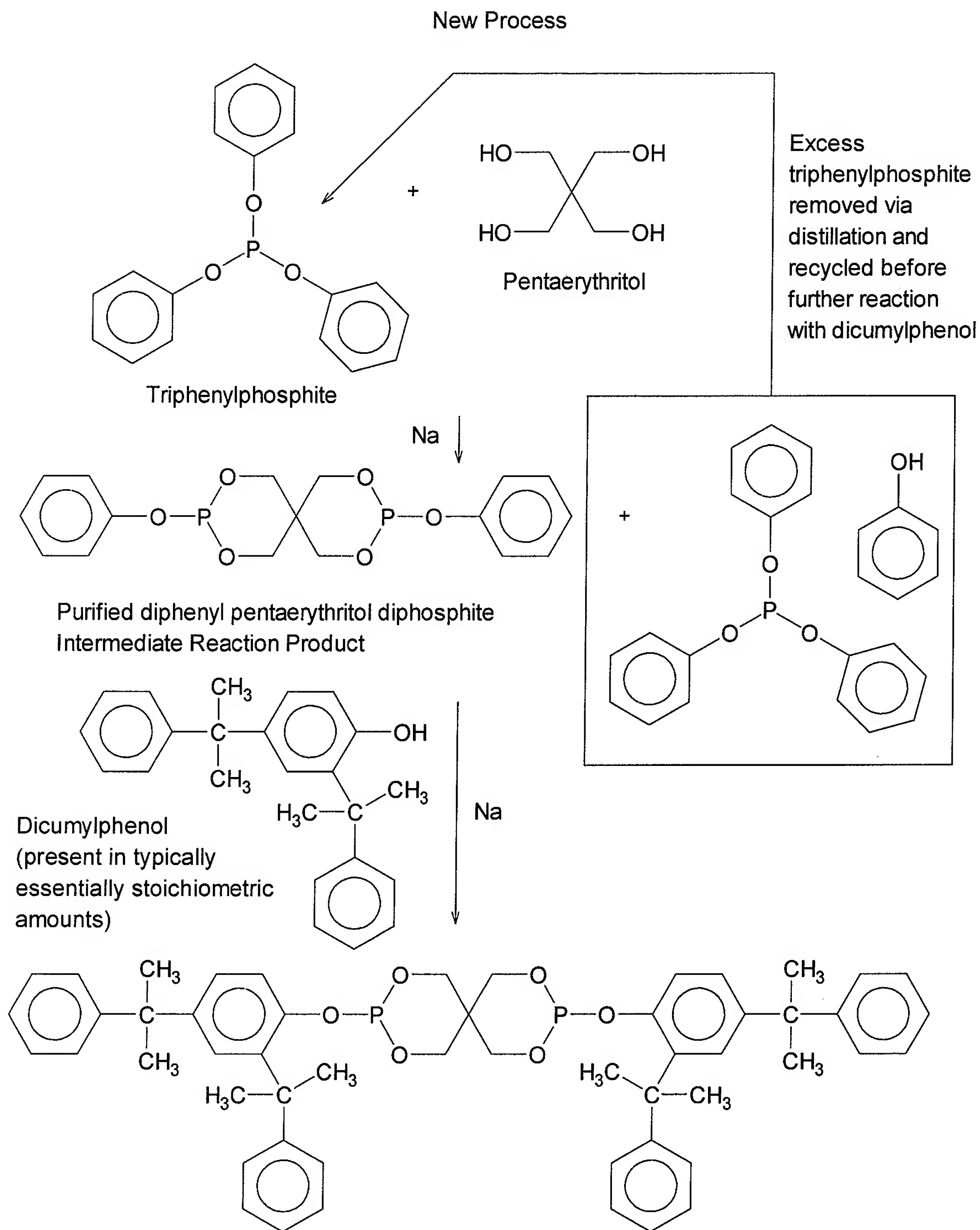
'086 Patented Method – Schematic II



However, what is missing from the above is the fact that this is a solvent (e.g., isopropanol) process, which also employs xylene (see col. 16, line 62 in the '086 patent) and in reality, the above reaction is truly more complex. A more accurate, but still incomplete depiction of the reaction is illustrated below:

Old Process taught
 in the '086 Patent





Therefore, the old process, which typically uses approximately a 25-50% molar excess of dicumylphenol, produces a yield of S-9228 of approximately 65%. Excess dicumylphenol must be removed

from the final product by centrifuging from xylene, followed by washing with xylene and finally drying. The mother liquor is then distilled to recover approximately 95% of the used xylene. The mother liquor which contains the by-products and excess dicumylphenol is subsequently scrapped resulting in a very significant loss of raw material starting materials in addition to the added costs for the heat required for the xylene recovery via distillation. For every pound of product produced, almost 0.9 pounds of unwanted by-product is also produced at a cost of about 2 pounds of solvent. The effective utilization of dicumylphenol is approximately 57% with the excess going to waste by-product formation.

By comparison, there is no solvent required for the new process and it also eliminates the need for any xylene recovery as none is used. Additionally, the generation of by-product is essentially eliminated in that the intermediate is purified at a point when typically only excess triphenylphosphite and phenol are present, which can easily be recovered and triphenylphosphite recycled as a starting material. The subsequent reaction of the purified intermediate with essentially stoichiometric amounts of dicumylphenol produces an essentially pure final product, namely bis(2,4-dicumylphenol)pentaerythritol diphosphite.

Therefore, the breakthrough is the recognition that by purifying the intermediate, the final product is also higher in purity without the need to go through a xylene wash, followed by drying with simultaneous xylene recovery, thereby saving in manufacturing costs. The entire reaction sequence and end-product purification is simplified and rendered more cost-effective from a manufacturing standpoint.

Claim Rejections – 35 USC §112

The Examiner has rejected claims 1-89 under this section, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Specifically, the examiner has indicated that claim 1 is a Jepson-type claim. With due respect to the position taken by the examiner, it is submitted that this may be an improper initial conclusion, which upon further reflection, will become evident. While the applicant's attorney acknowledges that it may be possible to write the claim in a Jepson-type format, there has never been any requirement by the Patent Office that claims be written in that format to the knowledge of the applicant's attorney. Claim 1 recites at least one additional limitation not taught in the Prior Art, namely:

“removing reaction products other than said intermediate pentaerythritol diphosphite from said first reaction mixture.”

This alone distinguishes the claim over the teachings of the '086 Patent, which the applicant's patent attorney also wrote. The applicant's attorney is always willing to learn new Office procedures, but has never come across any mandate that claims be written in Jepson format. In fact, it would appear that most every patent issued by the Office is an “improvement” which would essentially mandate that every claim be written in Jepson format. While this may be an admirable outcome and certainly more prevalent in European practice, it

is respectfully submitted that very few claims are written in Jepson format.

The examiner has indicated that in step (a) in claim #1, the monophosphite is not identified. The examiner has suggested that the claim be amended to overcome this rejection by utilizing a Markush format. The applicant has implemented the suggestion made by the examiner using the generic formula illustrated in paragraph [0014] thereby rendering this rejection moot.

The examiner has indicated that proper Markush language provides for alternatives, and therefore, the phrase "C₆₋₁₁ substituted derivatives thereof" has been removed as it was already included in the Markush definition which is open-ended.

The examiner has indicated that "blends thereof" renders claim #1 indefinite. The applicant's attorney has removed this language from the claim.

Claim Objections

The examiner has noted that the claims are drawn to non-elected subject matter. Through amendment, this has been corrected.

The examiner has additionally noted that "wherein R¹ is selected from the group consisting of" is listed twice. The applicant's attorney regrets this typographical error and has amended the claims to remove the duplicative language.

The examiner has lastly objected to claim 32 in that there was no space between "claim 31" and "wherein." Once again, the applicant's attorney regrets this typographical error and has amended the claims to insert the requisite space.

Request for Consideration

Applicant believes that all independent claims clearly define over the prior art and that the distinctions between the present invention and the prior art would not have been obvious to one of ordinary skill in the art. Additionally, the remaining dependent claims, by the limitations contained in the base independent claims, are felt to be patentable over the prior art by virtue of their dependency from independent claims which distinguish over the prior art of record. All pending claims are thought to be allowable and reconsideration by the Examiner is respectfully requested.

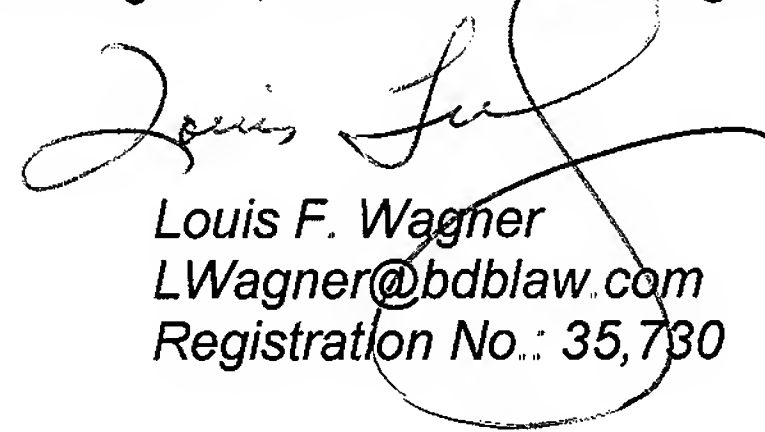
It is respectfully submitted that no new additional searching will be required by the examiner. A fee determination sheet is attached for this amendment response. The Commissioner is hereby authorized to charge any additional fee required to effect the filing of this document to Account No. 50-0983.

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